

DRAGON



USER

The Independent Dragon magazine

November 1987

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Not daunted by receiving 1 000 000 letters
from a computer (36) Gordon Lee
Gordon Lee now looks for the letter world

The Answer

Gordon Lee's solution to the August
competition

APPEAL + APPEAL + APPEAL + APPEAL.
In the struggle to get SEPTEMBER to its
rightful readers, some people were sent
equipped copies. We now have a
shortage in the office - and if anyone has
a spare SEPTEMBER they can loan to
part with, please contact tip and send it
back to us at your leisure

Editorial

WELL, they didn't lynch me at Rock-
dale. But if they had I would not have
been surprised. To all the readers who
phoned or wrote to us, particularly to
those who were told that one date and
then another, thank you for bearing
with us. Considering that she has been
answering the phone to Dragon users
almost back to back for the last three
weeks, and faces another week of it
while the stress crowd through the
post, Carol is still asking to rest, so
you must have been able to hear.

Thanks, it's been a very, very long
time since we last had our print date
(if ever, indeed) and I hope it never
happens again.

A small factor like someone leaving
suddenly can end up affecting thou-
sands of individuals who don't know
what's happening and wish it weren't,
not to mention those who think they
know what's happening, and wish it
weren't.

At 11pm on Thursday 17th Sep-
tember the first reader ASKED US
BACK TO SAY THAT HIS COPY HAS
ARRIVED! Thank you a thousand
times, Mr. Hurley! But I know some of
you still hadn't received it by the 22nd.
And the 23rd was the publication day for
the OCTOBER edition. No, I hope this
never happens again.

How to submit articles

The quality of the material we can publish in
Dragon User each month will be a very good
one, and you'll find you'll be a good one if
you can make it in your Dragon. The Dragon
computer was launched on to the market with a
powerful version of Basic but with very poor
documentation.

Articles which are submitted to Dragon User
for publication should not be more than 1000
words long. All submissions should be typed.
Please leave wide margins and a double space
between each line. Programs should, where
possible, be computer printed on plain white
paper and be accompanied by a tape of the
program.

We cannot guarantee to return every submit-
ted article or program. We should like to see
it, but we will not return it if you do not
include a stamped addressed envelope.

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Pamcodes

Part one of a new series on machine code for beginners by Pam D'Arcy.

HAVING volunteered to try and help B.F. Harding (October, September issues) and others like him, I have a couple of days before bedtime and just something to do so you can imagine what you are going to get this month — a bit of waffle and no real detail. However, because the getting started syndrome described in B.F. Harding's letter is often a big problem, I have included a few lines of assembler source code to see if you can all get going without needing another month simply waiting for the first real article.

Unusually trying to learn Dragon machine code for a beginner's reason, I will assume that you're already here.

- 1) at least one book on the subject
- 2) some form of assembler software

Rather than dive in with a blow by blow account of machine code, which may of necessity leave you dangling and code from one long month to another, my intention will be to present a series of self-contained articles. Some others will refer to programs in popular Dragon machine code books that provide practical problems with so that those of you who have those books in your possession, or want to get them, can get back later and tackle them with more confidence. This also operates as feedback for you to swap me with examples you find difficult, which I maybe able to write an article about.

Lack of standards

Using the Dragon's small Basic, variables may be letters C or string, and are given alphanumeric names of any length — making that for various planned and very good reasons. I have names truncated without to Dragon not to be too much notice when the Basic program is RUN. Thus variable names, for example, QUORUM and QUANTITY would both be called as a variable named QUL and the same memory location would be used every time of the variable QUORUM or QUANTITY (or any other name you fancy with the letters QUL) was encountered when RUNNING a Basic program — which could account for some unexpected results.

```
10 QUORUM=10
20 INPUT MEMBERS
30 PRINT "QUANTITY"
40 IF QUANTITY<QUORUM THEN
50 ? NO QUORUM ELSE
60 CONFERENCE MEETING
```

That is what you'd enter if — seven typists the word PRINT out always use the desirable shorthand question mark form.

In a similar manner Basic commands or keywords are replaced internally by a value or address that occupies a single byte of memory as the line of code is entered into the program (a procedure known as 'jumping' — and denouncing where it is converted back for LISTing purposes). If any of the names of our variables coincide with the same letters as a keyword

Listing 1: To make a list, then program, then run

Expected program assembler	Source code			
	Line number	Label	Mnemonic	Operand
10 20 30 40 50 60 70 80	10 20 30 40 50 60 70 80	GO 	LDG STG LFA STG STG STG STG	000 0000 000 000 000 000 000

the CRUNCH routine positively ruins our programming intention.

NO TOTAL-BALANCE-VALUE

It fails correctly because of the CRUNCH routine (or when attempting to RUN the program TO total and BAL of value will be followed keywords that the Basic might say do not make sense, so a gives a better error.

Why have I signified me not to go over what you probably know already about Dragon Basic when it is machine code that you are keen to get in good with? In the latter, why that Dragon's Basic (and all other Basic) has its own quirks and rules to do assemblers — and unfortunately these go to no one about assembler on the Dragon. Assemblers are simply a means to an end, a program that converts source code written according to ITS OWN rules to object or machine code that it places again, depending on its own rules, in its own or user specified addresses in memory. Apart from the fact that it organizes the 65 different types of source code instructions are represented by standard groups of letters, or mnemonics (memory groups, as in SUB for SUBtract and GND for GND, Not Equal) and that presenting the mnemonic field a literal source code will be a label field, and following the mnemonic will be an operand field, there are similarities between assemblers and making it impossible for anyone to present source code in forms suitable for input direct into an (or possibly even most) assemblers, produced for the Dragon. I shall therefore base the code as it is lightened as possible as the mnemonic adjustment is needed for it to be immediately acceptable to your assembler.

To rescue your Basic

I'll now include a few lines of source code for you to play with. There is no room to explain anything about this routine or its machine code for months other than to say that such a has assembled correctly (perhaps even a change is due this point) that a younger must not Basic program (CRUNCH) will add LIST a type in MEM then LIST again — to the Basic program has given BASIC the assembled routine from its list address and END LIST again, and the Basic program will have been entered to its former glory. It is also worth noting you have an RD error as you only saved copy of a Basic program. Load in this machine code routine and BASIC a and

the program line as far as successfully read will be available to you. This routine can be found in Dragon User July 1983 page 44 and June 1984 page 22 and in the Dragon Programmer's Reference Guide by John Weller (Haydon Publications House) pages 107 — 108. Note the printing errors in the assembler being on page 108! you find trouble with it — a common enough problem that I shall describe another one. The book is still available from Feedback.

Assembly

There are two stages in assembly: source code input or editing and the assembly process itself, or generation of object or machine code. Your assembler may include its own editing facilities, or a may assemble source code statements entered using the Basic editor (then the source code according to your assembler's instructions and rules. Line numbers may or may not be needed. Using the when not required or not wanted is likely to cause every line label error. The label on line 1 is not needed by the program itself, but is included in case it is mandatory in your assembler that the last instruction will be labelled. Your assembler may need an op or an if symbol to proceed to the next line. It may need the source code to be entered at particular columns or a line or lines may need to be separated by a specific character. The last line of source code may need a special value in the label or mnemonic field, hence a line leaving a line number 80 there is remind you.

The assembler instructions should tell you where the object code will be placed in memory, which may depend on any CLEAR statement you type in before starting or running the assembler. The above program will run successfully from any address within the Dragon provided obviously that it is not loaded into address occupied by the Basic program that is being relocated. Not into Basic's work space (Reserved graphics pages and higher addressed memory reserved for machine code) by using an appropriate CLEAR statement are also okay. Most routines start in the first page of a routine (the 30K Basic ROM line 25). Dragon 64 owners who would want to use the routine in 64K mode will need to add 4080 to the operand.

ASB SCODE

will be generating different object code being produced.

Motorbiking

Richard Byrne catches his buses in arcade style.

THIS is a simple if not arcade game where you control a motorised bus as he zooms over a busy street in a bid to pick up passengers and deliver them to their destinations as fast as you can manage it. To land successfully you do indeed must hit the top two-thirds of the clock meter. Buses are whisked jumping back in rather than through a long bus feature. Bigger the delay, the better.

The right hand joystick is used as an analogue joystick to reproduce proportional control. When it is pushed you will have slight forward velocity. Pull back to slow or stop and push forwards to accelerate. Tolerate your startup period, the first bus.

The engine noise at intervals drops by

reloading the IRQ interrupt by altering the address at locations 255270. This has to be done by loading the new address from cassette while the interrupt is delayed as altering it from inside the program can have disastrous results. This is why the station the game is made. Customers recorder play is optional to be left alone.

To enter the program type in the BASIC listing and test it. First making line 300 a REM statement. When it is running properly and the data in lines 160-190 has been checked, remove the REM from line 300 and C54V6 the program. You will not have sound facilities.

Quick-look enter the following

POKE 255270
POKE 170 65

Then, with the tape directly after the main program, enter

C54V6M 255 170 165

The game can then be re-loaded and run this time with sound. Before loading anything else, turn the computer off as the engine noise routine will corrupt any other saved such as PLAY or SOUND commands.

If you can't face typing the listing in C276 by the St. Th. Oakley Grove, Well, Weymouth, Dorset, then I'll tell you a couple of copies on tape.

```
10: 1: *****
20: 1: *****
30: 1: *****
40: 1: *****
50: 1: *****
60: 1: *****
70: 1: *****
80: 1: *****
90: 1: *****
100: 1: *****
110: 1: *****
120: 1: *****
130: 1: *****
140: 1: *****
150: 1: *****
160: 1: *****
170: 1: *****
180: 1: *****
190: 1: *****
200: 1: *****
210: 1: *****
220: 1: *****
230: 1: *****
240: 1: *****
250: 1: *****
260: 1: *****
270: 1: *****
280: 1: *****
290: 1: *****
300: 1: *****
310: 1: *****
320: 1: *****
330: 1: *****
340: 1: *****
350: 1: *****
360: 1: *****
370: 1: *****
380: 1: *****
390: 1: *****
400: 1: *****
410: 1: *****
420: 1: *****
430: 1: *****
440: 1: *****
450: 1: *****
460: 1: *****
470: 1: *****
480: 1: *****
490: 1: *****
500: 1: *****
510: 1: *****
520: 1: *****
530: 1: *****
540: 1: *****
550: 1: *****
560: 1: *****
570: 1: *****
580: 1: *****
590: 1: *****
600: 1: *****
610: 1: *****
620: 1: *****
630: 1: *****
640: 1: *****
650: 1: *****
660: 1: *****
670: 1: *****
680: 1: *****
690: 1: *****
700: 1: *****
710: 1: *****
720: 1: *****
730: 1: *****
740: 1: *****
750: 1: *****
760: 1: *****
770: 1: *****
780: 1: *****
790: 1: *****
800: 1: *****
810: 1: *****
820: 1: *****
830: 1: *****
840: 1: *****
850: 1: *****
860: 1: *****
870: 1: *****
880: 1: *****
890: 1: *****
900: 1: *****
910: 1: *****
920: 1: *****
930: 1: *****
940: 1: *****
950: 1: *****
960: 1: *****
970: 1: *****
980: 1: *****
990: 1: *****
```

[illegible]

[illegible]

```

0100 PRINT "*****"
0110 PRINT "*****"
0120 PRINT "*****"
0130 PRINT "*****"
0140 PRINT "*****"
0150 PRINT "*****"
0160 PRINT "*****"
0170 PRINT "*****"
0180 PRINT "*****"
0190 PRINT "*****"
0200 PRINT "*****"
0210 PRINT "*****"
0220 PRINT "*****"
0230 PRINT "*****"
0240 PRINT "*****"
0250 PRINT "*****"
0260 PRINT "*****"
0270 PRINT "*****"
0280 PRINT "*****"
0290 PRINT "*****"
0300 PRINT "*****"
0310 PRINT "*****"
0320 PRINT "*****"
0330 PRINT "*****"
0340 PRINT "*****"
0350 PRINT "*****"
0360 PRINT "*****"
0370 PRINT "*****"
0380 PRINT "*****"
0390 PRINT "*****"
0400 PRINT "*****"
0410 PRINT "*****"
0420 PRINT "*****"
0430 PRINT "*****"
0440 PRINT "*****"
0450 PRINT "*****"
0460 PRINT "*****"
0470 PRINT "*****"
0480 PRINT "*****"
0490 PRINT "*****"
0500 PRINT "*****"
0510 PRINT "*****"
0520 PRINT "*****"
0530 PRINT "*****"
0540 PRINT "*****"
0550 PRINT "*****"
0560 PRINT "*****"
0570 PRINT "*****"
0580 PRINT "*****"
0590 PRINT "*****"
0600 PRINT "*****"
0610 PRINT "*****"
0620 PRINT "*****"
0630 PRINT "*****"
0640 PRINT "*****"
0650 PRINT "*****"
0660 PRINT "*****"
0670 PRINT "*****"
0680 PRINT "*****"
0690 PRINT "*****"
0700 PRINT "*****"
0710 PRINT "*****"
0720 PRINT "*****"
0730 PRINT "*****"
0740 PRINT "*****"
0750 PRINT "*****"
0760 PRINT "*****"
0770 PRINT "*****"
0780 PRINT "*****"
0790 PRINT "*****"
0800 PRINT "*****"
0810 PRINT "*****"
0820 PRINT "*****"
0830 PRINT "*****"
0840 PRINT "*****"
0850 PRINT "*****"
0860 PRINT "*****"
0870 PRINT "*****"
0880 PRINT "*****"
0890 PRINT "*****"
0900 PRINT "*****"
0910 PRINT "*****"
0920 PRINT "*****"
0930 PRINT "*****"
0940 PRINT "*****"
0950 PRINT "*****"
0960 PRINT "*****"
0970 PRINT "*****"
0980 PRINT "*****"
0990 PRINT "*****"

```

```

00000  GETI(1,1)=0,0,0,0,0,0,0,0
00010  PUTI(0,0)=0,0,0,0,0,0,0,0
00020  FORI=1 TO 4
00030  FORJ=0 TO 3
00040  READA=PUTI(1,1),B,A
00050  PUTI(1,1)=0,0,0,0,0,0,0,0
00060  PUTI(1,1)=0,0,0,0,0,0,0,0
00070  FORI=1 TO 4
00080  FORJ=0 TO 3
00090  READA=PUTI(1,1),B,A
00100  PUTI(1,1)=0,0,0,0,0,0,0,0
00110  PUTI(1,1)=0,0,0,0,0,0,0,0
00120  FORI=1 TO 4
00130  FORJ=0 TO 3
00140  READA=PUTI(1,1),B,A
00150  PUTI(1,1)=0,0,0,0,0,0,0,0
00160  PUTI(1,1)=0,0,0,0,0,0,0,0
00170  FORI=1 TO 4
00180  FORJ=0 TO 3
00190  READA=PUTI(1,1),B,A
00200  PUTI(1,1)=0,0,0,0,0,0,0,0
00210  PUTI(1,1)=0,0,0,0,0,0,0,0
00220  FORI=1 TO 4
00230  FORJ=0 TO 3
00240  READA=PUTI(1,1),B,A
00250  PUTI(1,1)=0,0,0,0,0,0,0,0
00260  PUTI(1,1)=0,0,0,0,0,0,0,0
00270  FORI=1 TO 4
00280  FORJ=0 TO 3
00290  READA=PUTI(1,1),B,A
00300  PUTI(1,1)=0,0,0,0,0,0,0,0
00310  PUTI(1,1)=0,0,0,0,0,0,0,0
00320  FORI=1 TO 4
00330  FORJ=0 TO 3
00340  READA=PUTI(1,1),B,A
00350  PUTI(1,1)=0,0,0,0,0,0,0,0
00360  PUTI(1,1)=0,0,0,0,0,0,0,0
00370  FORI=1 TO 4
00380  FORJ=0 TO 3
00390  READA=PUTI(1,1),B,A
00400  PUTI(1,1)=0,0,0,0,0,0,0,0
00410  PUTI(1,1)=0,0,0,0,0,0,0,0
00420  FORI=1 TO 4
00430  FORJ=0 TO 3
00440  READA=PUTI(1,1),B,A
00450  PUTI(1,1)=0,0,0,0,0,0,0,0
00460  PUTI(1,1)=0,0,0,0,0,0,0,0
00470  FORI=1 TO 4
00480  FORJ=0 TO 3
00490  READA=PUTI(1,1),B,A
00500  PUTI(1,1)=0,0,0,0,0,0,0,0
00510  PUTI(1,1)=0,0,0,0,0,0,0,0
00520  FORI=1 TO 4
00530  FORJ=0 TO 3
00540  READA=PUTI(1,1),B,A
00550  PUTI(1,1)=0,0,0,0,0,0,0,0
00560  PUTI(1,1)=0,0,0,0,0,0,0,0
00570  FORI=1 TO 4
00580  FORJ=0 TO 3
00590  READA=PUTI(1,1),B,A
00600  PUTI(1,1)=0,0,0,0,0,0,0,0
00610  PUTI(1,1)=0,0,0,0,0,0,0,0
00620  FORI=1 TO 4
00630  FORJ=0 TO 3
00640  READA=PUTI(1,1),B,A
00650  PUTI(1,1)=0,0,0,0,0,0,0,0
00660  PUTI(1,1)=0,0,0,0,0,0,0,0
00670  FORI=1 TO 4
00680  FORJ=0 TO 3
00690  READA=PUTI(1,1),B,A
00700  PUTI(1,1)=0,0,0,0,0,0,0,0
00710  PUTI(1,1)=0,0,0,0,0,0,0,0
00720  FORI=1 TO 4
00730  FORJ=0 TO 3
00740  READA=PUTI(1,1),B,A
00750  PUTI(1,1)=0,0,0,0,0,0,0,0
00760  PUTI(1,1)=0,0,0,0,0,0,0,0
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00780  FORJ=0 TO 3
00790  READA=PUTI(1,1),B,A
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00810  PUTI(1,1)=0,0,0,0,0,0,0,0
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00830  FORJ=0 TO 3
00840  READA=PUTI(1,1),B,A
00850  PUTI(1,1)=0,0,0,0,0,0,0,0
00860  PUTI(1,1)=0,0,0,0,0,0,0,0
00870  FORI=1 TO 4
00880  FORJ=0 TO 3
00890  READA=PUTI(1,1),B,A
00900  PUTI(1,1)=0,0,0,0,0,0,0,0
00910  PUTI(1,1)=0,0,0,0,0,0,0,0
00920  FORI=1 TO 4
00930  FORJ=0 TO 3
00940  READA=PUTI(1,1),B,A
00950  PUTI(1,1)=0,0,0,0,0,0,0,0
00960  PUTI(1,1)=0,0,0,0,0,0,0,0
00970  FORI=1 TO 4
00980  FORJ=0 TO 3
00990  READA=PUTI(1,1),B,A
01000  PUTI(1,1)=0,0,0,0,0,0,0,0

```


Interrupt driven sound

When does an interrupt produce a continuous sound? Gareth Fenton explains.

In Dragon Answers in a recent issue of Dragon User it was shown it is possible to produce soundfiles which play continuously while a program runs (as in *Omni Commander* and the like). The following program is my solution to the problem and more by using the Dragon's IRQ (Interrupt Request) interrupt.

To enter the program type in the loading program (LOADING) and RUN it. It then asks for initial data you will be advised as soundly and in which line the error lies. Once it is successfully entered, save the data as a disk caused by any incorrectly typed numbers could result in complete loss of control of your computer (the only counter agent is you being to switch off and start again).

To use the loaded program, use the command `EXEC SH7500`. The value of `n` will determine which of the three options is to be used.

The options are summarised in the following table:

`EXEC SH7500 SWITCH-TUNE OFF`
`EXEC SH7500 SWITCH-TUNE ON`
`EXEC SH7500 CHANGES NEW TUNE`

The option Define new tune needs some further explanation. To create the tune to be played can be format:

`EXEC SH75002` space (separated by a comma)

The number after the slash is the time at that used by the Dragon's `SOUND` command. For example, `2` is represented at the manual `SOUND(2)` and play Mode C for a short duration. `EXEC SH75002 2` will play Mode C repeatedly until the sound source is changed or until `EXEC SH75000` is entered.

In order to avoid slowing the host program the rate produced is very slow. Therefore it may be necessary to repeat the rate to make a specific longer.

If you make an error at the definition of a new sound source, a new error message `195 ERROR` (Pulse timing will be delayed) and any tone currently being played will be switched off. Also, any error is

a Basic program which uses the program will automatically reset the rate of sound. The defined series of rates must be less than 255 — the `P3` entry will read if you attempt to define any further notes.

To make a short pause in the tune, the number 255 should be used instead of a note value. The program will accept a variable instead of a number so by using `P=255` the variable `P` can be used to represent a pause. In the same way other variables can be used instead of notes for example `C=88` defines variable `C` as middle C.

A point to remember is that the interrupt driven sound must be switched off (using `EXEC SH75000`) before using the `SOUND` or `PLAY` commands.

That is all the information you require to use the program from Basic. If you wish to use it from a machine code program it is intended in listing out how it works, the complete assembler listing is included and the rest of this article is devoted to its explanation.

As I have already mentioned, the program works by using the Dragon's IRQ (interrupt) which occurs every 1/60th of a second. As well as being used to update the basic `TIMER`, it is also involved in synchronising the video output to the frame buffer of the TV set and so must be used with care.

In order for the program to work, the IRQ vector (the address the IRQ jumps to when it starts) must be changed to point to a dispatch routine which calls the new program and then jumps the ROM routine to handle the interrupt. The vector is `$800` is changed to point to `$0000` (the new dispatch routine by the value `$0000` is reset to its normal value of `$0000` by the routine `$0000`).

While it is possible to change the IRQ vector to point to your own routine directly from Basic, it is not advisable as you must wait and up listing any program correctly stored in memory. It is better to use a machine language routine so I have done — it is much simpler although the IRQ should normally be left alone unless you are sure what you are doing.

Another important part of the program is

the routine which actually makes the sound (`$SOUND`). This makes use of the ROM routine at address `47799` which sounds a beep for the length in the `B` register of the pitch/octave in location `140` (hex `88C`).

In Basic, the `INTERRUPT` facility playing of notes resulting in the 'crackling' that is particularly audible during high notes. To produce a cleaner note it is necessary to turn off or mask the interrupt. This is done by logically `ORing` (by adding an `OR` code register with `50` they are enabled by `AND` logical `OR` with `50`). Unfortunately this must be done from `$ASIO` because the `SOUND` and `PLAY` commands use the interrupt to determine how long to play each note. With interrupts disabled, the notes will play as desired. To get round this problem, the program has a sub-routine set up to maintain notes independently of the IRQ which is then disabled. This is done by the sub-routine `$SLEEP` in the `$ASIO` listing.

The routine `$COMMAND` determines which option has been selected. It makes use of two ROM routines. The first `$COMMAND` checks that the next character in the command buffer is a comma, copying on if it is and causing a type in error if not. The second routine is `$GETNUM` which will return the number or variable in the command buffer as an eight bit value in the `B` register causing a function error if the character is not a number or variable name (or register) (line 244).

It is to use this program you need machine language programs. The routines `$SWITCHON` and `$SWITCHOFF` cause the interrupt. The rate values can be stored directly in the sound buffer so need to be by `$SET+VALUE` (remembering to increment the `length` by a variable). As the `length` when using this program from Basic is a byte value of `255` (FF) will cause a short pause.

The length of each note played can be altered by storing an alternative value at `$PULSE`. This is originally set to `10` and I suggest it isn't used changed if you hope to use fairly short or otherwise it will slow down the program too much.

My thanks to Brian Cudge for his very useful comments and suggestions and some of the ROM routines used in this program.

Listing 1

```
10 "INTERUPT DRIVEN SOUND
20 "LOADING PROGRAM
30 FOR A=H7500 TO H750F STEP16
40 BUK=BUK+1
50 LC=0
60 FOR L=0 TO 15
70 EXEC H7500
```

```
80 READ A#
90 B=VAL("H"+A#)
100 POKE A#L,B
110 C=C+B
120 LC=LC+B
130 NEXT L
140 READ D
```

```

150 IF L&<D THEN SOUND(,1):PRINT"DATA ERROR IN BLOCK";BLK:STOP
160 NEXT A
170 IF C<>17020 THEN SOUND(,1):PRINT"THERE ARE AT LEAST TWO ERRORS.
CHECK CHECKS
UNG":STOP
180 PRINT"DATA CORRECT. I SUSPECT YOU SAWTHIS PROGRAM"
190 END
200 DATA BE,75,23,BF,01,93,84,7E,B7,01,01,1A,10,BE,89,AA,1759
210 DATA BE,BE,B1,5D,37,0B,C1,01,27,10,C1,03,37,13,0A,01,1260
220 DATA 7E,B3,44,BE,9D,3B,BF,01,0D,39,BD,43,BE,75,4D,BF,1713
230 DATA 01,0D,39,BE,75,9B,34,10,BD,89,AA,BD,BE,B1,35,10,1578
240 DATA B7,B0,BD,75,9B,9E,B7,5D,3A,EC,B7,84,39,BD,03,7E,2137
250 DATA 9B,39,73,75,9B,27,03,BD,01,39,1A,10,BE,75,99,A6,1510
260 DATA BE,37,3B,B1,BF,2A,07,BD,1C,BF,75,99,20,14,BF,75,1629
270 DATA 99,B7,00,BC,3F,BE,BA,BD,7A,75,97,2A,FB,B4,0A,B7,2109
280 DATA 75,97,1C,BF,39,10,BE,75,95,31,3F,2A,FC,39,BE,75,1830
290 DATA 9B,BF,75,99,39,03,0A,0A,FF,00,00,75,9F,7A,9E,00,1493

```

Listing 2

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Winners and Losers

Every month
Gordon Lee will
look at some prize programming

MULTIPLES of 17 were the name of the game in the June competition — the problem being to list the longest possible sequence (or sequences) of full-grown numbers (that is, each number in the sequence must begin with the same three digits as the one that precedes it) in which the number is the multiple of 17 of the preceding number.

The solution, as given in Dragon, gives two sequences of eight numbers in each. These are shown below, the number in brackets indicating the multiple of 17 of each step:

0000	(3300)	0000	(3000)
0002	(100)	0002	(3000)
0020	(3000)	0020	(3000)
0200	(3000)	0200	(3000)
2000	(110)	2007	(110)
0000	(14)	2070	(104)
2000	(140)	2700	(104)
2000	(210)	7000	(104)

Each of these series ends when the final three digits of the last number cannot represent the first three digits of a multiple of seventeen in the series above 999 and 999. For example, to take the first of the numbers, the next lowest multiple of 17 that would be still be required is 0070, but the one above being 0020, thus, all values in the right thousand and eight hundred series jumped.

These were the results given, but a number of readers came up with a third sequence of eight values commencing with the digits 0007:

0007	(10)
0010	(100)
0100	(10)
1000	(100)
0000	(10)
0040	(100)
0400	(10)
4000	(100)



The acceptance of this as a valid answer separates this leading zero issue. Philip Bond of Gosport was one of the winners who picked up this particular point. He writes:

A simple test for my program was to use the value you gave to check my results against your own. However, with my first program I got different results even though my program seemed correct. Closer examination revealed that you had included a three-digit multiple with a leading zero. So I also included all multiples which could be made four-digit by adding leading zeros. This gave me these winning results:

any one in which contained no leading zero multiples. I had these should be only one answer except the one especially in the July of January the leading zeros are not usually allowed unless specified, and you did not specify it but implied it by it stating one is your multiple? I took freedom to assume that the leading zero question.

So the question is, do we allow leading zeros in which case there is but one solution (0000) or not? or we allow leading zeros but not in the final number giving two solutions: 0000 and 0000? or do we allow several times use of leading zeros to give us three solutions: 0000, 0000 and 0000?

In my report, the first option (allowing single unique solution) would be chosen, as it was the best, but the most satisfactory — although it was the second option which I had in mind when devising the question. However, I was in. As the question as set contained the ambiguity, all three options were considered and I thought for some time of the assumptions and produced after the first two solutions in all times, but no more points were added for getting the third option. And nobody at all came up with your options two and three or one and three, because all of you were aware of the leading zeros question and either deliberately included or deliberately excluded it. Either way the programming required was of the same nature — 20!

However, all of this was in danger of being made irrelevant by one solution displaying a sequence of solutions (yes, an even) numbers. The relevant part of the list which accompanied this entry is given here, and it provides an interesting example in reverse programming.

Can you spot just what the program does and where the programmer went wrong? I'll give you my solution next month.

```

10 REM SEVENTEENS
20 FOR I=1 TO 999
30 L=1:X=I*10
40 R=X-17*INT(X/17)
50 IF R<10 THEN L=L+1:X=10*
  (VAL(RIGHT$(STR$(X),1))+R:
  GOTO 40 ELSE IF L>M THEN M=L:N=I
60 NEXT I
70 PRINT"The longest sequence starts
  at";STR$(N);", and is";
  STR$(M);" numbers long.":END
  
```


Write: ADVENTURE

Peter Giernard adds verbs to your adventure

As promised at the end of last month's article, this month we'll be looking at the relatively unpleasant part of adding verbs to your adventures: and this unfortunately changes.

Adding verbs is a fairly straightforward task, and since our parser already is a recognized verb recognizer, it takes a second and a half for particular verbs we can't then add anything like

1000 IF VD=SE THEN 2355

or whatever, always knowing that two can of worms are the

1000 ON V0 GOTO

command to take all this space.

Assuming that we do that, we then need some verbs for characters. The thing that we're using this month comes from an adventure that I have recently completed writing. One of the characters is a ship called Shemlonger the Ship, and he is there to help you in your quest. We'll assume that you've included in your program a few 1000 commands and an initial forward has appeared.

Now then, the syntax which the player is used to in use in this game when he's talking to characters, that is, takes the form SAY TO CHARACTER DO SOMETHING. That is assuming we were talking to our wizard lord and wanted him to GO EAST. One would enter SAY TO STORMBROWER DO EAST and this is what we have to work on.

There are other things that can be said magic words, and for these the player is told that he has to use the syntax SAY (MAGIC WORDS). During these things in mind, take a look at the listing.

There are several other things that the player can say to the program, and I'll mention something for two magic words that the program will recognize. These are stored out in lines 2350 and 2351, and if

either of the two words are said (as in SAY PC0327 W034F T035F), then program code will go on to two different sections. These just determined whether or not the player is in the correct location for the words to have any effect.

From here on, notice that the player is trying to talk to someone, or something, and he will ask for the code he is used to sort all this out. Lines 2352 and 2354 determine where the quotation marks appear in the player's input, which then goes up a variable table. Thus if the player typed in say to STORMBROWER "CAST A SPELL", then table would contain "CAST A SPELL", leaving the rest of the string unchanged. If however the program fails to find any quotation marks, PC+443333 by the way, then the program execution goes off to line 2355, the point up a variable pointer for what the procedure considers to be a continuous input.

Having found out what we're saying we then turn to find out who we're saying this, and here the purpose of the first part of the line 2355, which goes on, is to find the name of the person being addressed. If for any chance the player were to type in SAY TO ME, HELLO, (the program would then respond with HELLO. There would not be any going back off to line 10 to get another input. If the player said talking to Shemlonger I told you 2357 and the initial part entering off to line 2358, which will come to later.

Now then, what does the player tell us to say and that he's trying to say it to Shemlonger. So line 2354 checks to see if the word is a magic word, if it is, it's out the back of the parser, and if it isn't, then the program finally informs the player of the last sentence going off to line 10 again.

Line 2355 is the start of the line which checks for the particular verb, and goes if repeated that the verb being said doesn't exist. This is valuable in indicating that Shemlonger has been speaking and that he will then stop paying for the price for a while if you don't give him anything to do then he'll be miserable enough, gets bored. Then if the player has typed in SAY TO STORMBROWER "FOLLOW ME", the old word goes off to line 2356 and that he's there, and we go to line 10 again, which is the particular game is out, then control line for the game is. All right, this does keep the record by you, longer.

Line 2356 is used to tell the player that the syntax is okay to say that he (the wizard) is thinking about it, and then it sets up a little delay going line 2426 (it's just FOR -1 TO 9999 NEXT RETURN). Lines 2359 and 2362 are a measure parser and they attempt to answer the player's request by splitting it up into a verb and a noun. If the player has only entered one word, line 2363 prints up message number 150, which is something to the effect that the



wizard doesn't understand one word requests and you'll have to type in something else. These messages are stored out under the subname at line 5595, which simply accessed a line or lines and printed on the screen the right message. And having said that, an incredible epilogue for writing upper and lower case in the listing, but also my (Shem) is not equipped to tell out things. Just as we're in upper case all the time.

Anyway, there's really only two things the wizard can do, those being in GO somewhere and in CAST a spell, and if he's off these and the case we go to line 2367 and 2368 respectively. Otherwise, another magic pointer comes into play, and line 2365 to 2366 which what verbs have been entered. If it is a recognized one, then we carry on otherwise, print out a message that the wizard is not going to comply and that off to line 10. If it is a known verb and it happens to be verb number 19, 20 or 23 (these being GET, TALK and GARY), then a message about the wizard not being able to be made to be a character is printed by verb 14. GARY gives you a "don't worry" message, but if none of these words are in, then the wizard message about not complying is used and we return in always to line 10.

Lines 2369 to 2376 are what about casting a spell and if the player hasn't typed in CAST A SPELL, or CAST SPELL, then line 2369 sends him packing with a suitable message. You've got to go to line 27 for the wizard to be able to cast a spell, anyway, which is what line 2381 wants and, and you can't be greedy and have more than one said for you, which is what line 2382 does.

Lines 2383 to 2384 consider themselves with the number of times that the wizard has raised the pub, and if he hasn't over beer there after you've said word for him his hands are shaking and he can't do it. If he's been here more than four times, then he's too drunk to cope, but all being well he'll cast a spell and open up a new page for you. Then we increment the count, set the cast spell variable on, and change our





AMONG malicious lies and rumours put about by scoundrelmongers and thieves, one beloved editor forgot to remind you fully about when the deadline for this month's issue expired. It seems about five minutes after I've finished this article go to all those people who are and in hope the last month's Pete's Simon and A.H. Bessley and Robert Mearns and someone who seems to be unapproachable but could well be Gerd! (Gloing for all I can make out) many apologies, and over the next week or so I'll be editing in the Dragon from his bar. Then I can dress it all up, put it all down, and start all over again. All together now.

Actually I'm quite looking forward to Robert's games, as he gives a brief description of it in his accompanying letter. Apparently the game is called The Jewel of Time, and in it you have to stop time slopping. This is even sounds quite nice but I've included some complications. Sounds easy? He goes if Emilian had trouble with the stuff (Andy Johnson, I read) then I'm sure that even Tolkien's Pete's game has the odd problem or two.

Mr Bessley (he doesn't tell me his first name, must be a) has a game called The Jewel of the Andia quize. It has a name along time to complete it because it started off merely as something to do in my spare time. How often have we heard that follow advert are written? I've just completed an adventure at my own (based on that legendary stuff Dink (Gloing), and I thought I'd set some kind of a record by doing it in a week, writing it initially as a combination of favour for friend and interest in producing a truly bizarre adventure. Four weeks later and I was still writing as some more changes prior to writing this. That's the way it goes.

As for Simon's game, the man writes now about it in his Scott Adams. I'll be particularly interested in The Jewel of Life, where Simon assures me that the answer is HOT 42, and that you have to control four characters. It would seem that you can make them eat, sleep, eat, drink, and so on as he delicately puts it, "on things to each other". The mind boggles, boggle boggle boggle goes, and one has to sit to play the game whilst in class in the room. We shall see we shall see.

Why you may wonder, I am reminding all these games? Well, over past week reader you have noticed that there are precious

few adventures being released by other mental companies for your friend the Dragon these days. Indeed, as Simon points out he hasn't heard of anything since Tanglewood, and that is quite some time ago. Consequently any individuals who are releasing games need all the publicity that they can get, and over the next couple of months I'll be doing the best that I can.

Why I should be that companies have disappeared the Dragon such drives is a bit of a mystery to me, why (people) haven't suddenly all got rid of their computers (apart from a temporary loss for Simon whose machine blew up) and therefore all a large number of Dragons in regular use by other people. Well, I shall see.

But enough of this tedious phrase to reason. The Dragon as an adventure player's friend, and on to your careers, shapes, wishes and means to be at someone's perhaps? Well, all the just this month is a letter from Stephen. It's really stuck! Word which begins "Dear Pete The Game" that's the way to do it, go on your way to the top of the heap. Anyway, back to our old friend George. I must have had more letters about it a game than any other, but this time a serious complaint. Stephen (what's first the thing) and says that it's not quite plain that he (the Dragon User possibly?) may say, or at least might say, "Well, I read Stephen, we who have the complete solution can reliably inform you that if you follow the following ten steps you'll be well on your way to success, and I'll also help a number of other readers who seem to get stuck at step 10. He continues writing because it takes too long, and the editor is not likely to hope for anything down my neck.

1) Go to the 3rd computer (not a mainframe) and PRESS FOUR.

2) Get the Puffy Creature.

3) Go to the blank space with the alien creature.

4) Go forward 2 places and THROW FUZZY.

5) Get the light cube.

6) Go to the 4th and defend him (very peasy I know).

7) Look at the screen of the main computer.

8) Get the Wizard and the STAFF.

9) Go outside the window corridor.

10) HOLD BREATH and enter corridor.

These that should sort out a few problems like a collection of your Syzygists. Stephen's real query takes us on to whether old language. The Wizard Factor, which is probably the second most popular (or unpopular depending on your point of view) adventure for the Dragon. Poor Stephen can't get up the time machine to work, and as for the benefit of him and anyone else who's stuck at the same point another collection of steps takes in order to get going, ensuring that you've got the pellet and red cartridge and you've got the the opinion by using the MT. There.

1) Drop the cartridge and the 10 search. Cut the letter and drop the hardware. Squash the time, pour the excellent drop the two pellets and the fuel.

2) Go to the bed and has good at. Wear the suit and get the coat. Put the coat and the fuel into the device. While in the device insert the YELLOW cartridge and press the button.

3) Cut the time machine and examine the bookcase and the screen. Take the pink cartridge and the 10 gas. Open the disk and examine it. Read the document to find the combination of the cube. It is 11 25 42 (November 28th, 1942).

4) Put the 10 in the machine and drop the target and the document and the pink cartridge. Go to the device. Drop the coat (put it from the time machine) and GO! Press the button and enter to the time machine.

5) Remove the yellow cartridge and insert the red one.

6) Press the button and GO! Open the safe to get a blue cartridge.

Right, that's the story for it and the reader the time machine up and running and you wishing about it all over I'll be glad. Stephen should not be brought for "really stuck" but let's not neglect the Pete The Game for all right?

Where's the next letter? Dear Dragon User, I made. Go well down to earth with a bump, open as usual. As reminding letter that from someone who will obviously be a doctor one day (because their sightless is not the good but I assume it's like FR. It's like. Help don't know? I'll answer lots of people and any

But because the timing was just right, FR Elite must be a wolf! It has been driving around in Montreal with the Moscovici and has extracted some of the messages that are used by the game. I sent you the whole lot, but just put them, although anything that indicates gameplay or files according to a label on the parchment is a secret message has been exposed. Obviously, really, something got to every day and it's looking about playing Russ and I understand passages Arneap FR Elite also includes the code commands that the program will use (I am not sure that the secret ones are spelled so for anyone still trying to play them very in-depth the topic, here they are:

H GET MY CROP BACK JUMP LAMP
CHINESE FILL ASK LOOK SCORE WILL
RUN CROP HELP CLIMB THE STUB
WITHIN MINDA DREAM ASK FROM
OFFICIAL BELONG FROM ISHTAR PLAY
THROW THE GRAB CLIMB UNDER

Under² Intergroup Commercial Anyways
 Bumped for all that too

[illegible]

Two: *Cable Island Jerusalem Adventure*
 3: *William Adventure 2* (small new cover
 from the seller - I say (you in either case)
 PG) (maybe replace an SAG, the issue or a
 little bit bigger than *Dragon Year 2* *Arise*)
 Page to the dragon user because they are
 all big, heavy, new in it. This is a common
 very rare, as found once again, all letters
 of *Arise* to the P. over one

[illegible]

E? Deafness is another popular one. I met one in the later life class without musical playthings that caused problems for one of us. I'm not sure who didn't have the hearing aids or what you were supposed to be doing. Since I haven't got access to good

From all now, we'll conduct the month by posting Part One, and provided that I remember the chance I'll try to help you still start the month with Part Two. The original creative ideas now.

You awake, dazed and confused, in the middle of a desert in the aftermath. You had been learning the techniques of surgery from an old man who lives in these parts. He told you that an evil sorcerer is at work, but because he has every Now your teacher is missing and you are alone. Worse still, you can't seem to remember those techniques that you already had learned. The only thing that you can recall is the curious signs.

Remember well the power word
Remember I had fifteen (not six) boards
Answer to it in fifteen (not six) seconds
Throw off the yoke of confusion

You have entered the world of El Diablo where you must learn to argue and use magical "power" in order to prepare for the final confrontation with your adversary. El Diablo accepts commands in the form of one or two word sentences. For example, LOOK AROUND or GET BACK are valid commands. Only the first two letters of each word are used. Make this as big as you want an "easy" subject as if you are not an experienced adult user you may want to hire a tutor. Good luck!

He says that it takes a day to make just two bars so, says the Virgin Press, "goodwill".

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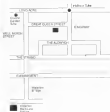
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word children, subjects, age 7-8; each

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Abstract